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ABSTRACT

The relationship among socio-economic status, sibling variables, social-psychological home environment, parent involvement in intervention programs, and child self-concept and achievement were empirically investigated to determine the importance and kind of parent participation most closely related to childrens' cognitive and affective development. A sample of 321 second-grade children and their families from two Parent Education Follow Through Program (PEFTP) sites were studied. Data were collected using semi-structured interviews and program records, and were statistically analyzed using LISREL. Reciprocal relationships were discovered between: (1) parent involvement in the PEFTP and the home environment; (2) self-concept and achievement and; (3) achievement and the home environment. Active parent involvement in the program, reinforcement, stimulation, expectation, and the social-psychological family environment were related to increased achievement performance and self-concept. The information obtained through this investigation may be useful in the design and implementation of future intervention programs.
(Author/AEF)

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The Relationship Among Socieconomic Status, Home Environment, Parent Involvement, Child Self Concept and Child Achievement.

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March 24, 1981.

ABSTRACT

This study investigates the relationship among socioeconomic status, sibsize, the social-psychological home environment, parent involvement in an intervention program, and child self concept and achievement. A sample of 321 second grade children and their families from two parent education program sites were studied. The family environment, socioeconomic status and sibling variables were collected using a semi-structured interview. Child achievement and self concept scores were collected during the Spring of 1980. LISREL was used to statistically analyze the data. Implications are made for compensatory education involving parent support and the influence of the home environment on children's behavior.

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INTRODUCTION

Programs in compensatory education are conceived as strategies of child development and, ultimately, poverty prevention. Their primary goal is to remove disadvantages to school learning acquired in early childhood that are presumably responsible for the educational failure poor children often experience. Recently there has been pressure from Federal sources to include emphasis on the home and family in intervention programs (e.g., Title I, Follow Through). Although this emphasis has been criticized, it is believed that including family intervention will improve the child's chances for success in school. There is a growing body of research evidence which supports the efficacy of parent education programs in enhancing child achievement performance (Bloom, 1980; Bronfenbrenner, 1974; Clarke-Stewart & Apfel, 1978; Goodson & Hess, 1975; Olmsted et al, 1980).

It is generally accepted that the home environment is critically important in cognitive and affective development (Bloom, 1964; Hunt, 1961; Marjoribanks, 1979). However, no widely accepted theoretical model of family environments exists, after more than 70 years of research in this area. We are able to identify some important dimensions of the social-psychological family environment, but we are unable to explicate the exact mechanisms through which these dimensions influence child development.

The most widely researched model of the family learning environment is the environmental press model associated with the work of Bloom (1964), Dave (1963) and Wolf (1964). Recent examinations of the construct validity of the environmental press models suggests that the models are inconsistent with the observed data (Williams, Note 1). A social learning theory of family learning environments which proposes that the cognitive abilities of children are associated with parents' expectations for their achievement performance, and the quality of intellectual stimulation and reinforcement provided within the home. Recent research evidence appears to be consistent with this perspective.

The Parent Education Follow Through Program (PEFTP) attempts to assist parents in improving the home teaching behavior and to create a home environment facilitative for learning (Olmsted et al, 1980). This is accomplished through the meaningful and intensive involvement of parents in all aspects of the educative process. The expectation is that through the improvement of the home environment the increases children experience in school achievement will be enhanced and maintained long after the child completes the intervention program.

The purpose of this study is to investigate the relationships among socioeconomic status, sibsize, the social-psychological home environment, parent involvement in the PEPTP, child self concept, and child achievement. A model involving these variables was developed and empirically tested in which sibsize and SES acted as exogenous variables. Parent involvement and the home environment dimensions acted as intervening influences between the exogenous and the ultimate endogenous variables, child self concept and achievement.

METHOD

Sample

A sample of 321 second grade children and their families from two PEPTP sites were included in the study. One hundred forty-seven from Yakima, Washington and 174 from Tampa, Florida. The program has been implemented continuously in both locations for the past ten years. In Yakima, approximately 80.3% of the families were White, with the remaining 19.7% Black, Chicano or Indian. In Tampa, 53.7% of the families were White, 37.1% were Black, and the remaining 9.2% were Spanish speaking. Mean father's occupation on the Duncan SEI scale was 25.0 in Yakima and 26.5 in Tampa and median family income in both samples was between $6,000 and $12,000. In Yakima, approximately 74% of the mothers and 66% of the fathers completed at least high school. In Tampa, about 58% of the mothers and 57% of the fathers completed at least high school. Both parents were present in about 70% of the families in both samples. Boys and girls were equally represented in both the Yakima and Tampa sample.

Measures

Information regarding the family environment, SES and sibsize was collected using a semi-structured home interview. Four dimensions of the home environment were measured: (1) Educational/occupational expectations (.87); (2) Language stimulation (.90); (3) Reinforcement of expectations (.92); and (4) Educational/reading activities (.87) (note that internal consistency reliability estimates are included). All interviews were conducted by trained interviewers and inter- interviewer reliabilities were greater than .80 in all cases.

The parent involvement data were collected from program records pertaining to the frequency of PAC meeting and activity attendance, years of program participation, home vi-

sitation, and the frequency and kind of classroom volunteering activities.

Child achievement was assesses during the Spring of 1980, at the appropriate times, using the Stanford Achievement Test in Yakima and the Comprehensive Test of Basic Skills in Tampa. Self concept was measured using the Self Observation Scales (Wenner & Katzenmeyer, 1979) during the Spring of 1980.

Statistical Analysis

The data from Yakima was used to intitially develop a model of the relationships among the variables included in the study. Following this analysis, the data from Tampa were subjected to the same structural model to determine the replicability of results. LISREL IV (Joreskog & Sorbom, 1978) was used to determine the theoretical structural model which best fits the covariance structure of the observed data. This was accomplished through the specification and estimation of a measurement model and a structural model. The measurement model specifies observed variables used to estimate the latent constructs, which in turn are utilized as exogenous and endogenous variables in the structural model. Maximum likelihood estimation procedures were used to derive all the parameters in the model simultaneously.

RESULTS

A test was performed to determine whether the covariance (correlation) matrices of the variables of interest within the two samples were equivalent. The test of this hypothesis resulted in a chi-square of 522.88 with 231 degrees of freedom ($p < .001$). Therefore, it was concluded that the covariance matrices for the two samples differed significantly. This finding precluded the possiblity of pooling the data from Tampa and Yakima.

The results of the statistical analyses for each different sample will be discussed separately beginning with Yakima.

YAKIMA

The results of the statistical analyses for SAT total reading scores and total mathematics scores are contained in Tables 1-2. The measurement model estimates will be discussed next, followed by the results for the structural models involving total reading and total mathematics scores.

Measurement Model

The latent construct, socioeconomic status, was composed of the household items index, the primary provider's educational level, the primary provider's occupational status, and family income. The factor loadings for each of the observed variables on the latent construct were .845, .496, .633 and .707, for the household items index, educational level, occupational status and family income, respectively.

The construct, active parent involvement, was composed of the observed variables (1) parent classroom volunteering of an instructional kind; (2) parent classroom volunteering of a noninstructional kind; (3) PAC meeting attendance; and (4) PAC activity attendance. The factor loadings for each of the observed variables on the parent involvement construct were .790 for noninstructional classroom volunteering, .642 for PAC meeting attendance and .305 for PAC activity attendance. The weight for instructional classroom volunteering was fixed to 1.0 in order to set the metric of the factor.

The remaining constructs were considered to be well represented by their respective observed variables. In other words, the construct sibsize was measured by the number of children in the family. Similarly, family years in the PEFTP, home visitation, self concept, achievement and the four home environment factors were considered to be equivalent to the constructs they purport to measure. The same measurement model was used in all subsequent analyses involving the data from Yakima.

Reading Achievement and Self Acceptance

The chi-square goodness of fit statistic for the overall model was 74.4 with 65 degrees of freedom ($p = .1985$). The nonsignificant chi-square indicates that the specified structural model represents an adequate fit to the observed data. The results of the structural equation analysis for this model, including standardized structural coefficients are presented in Table 1.

TABLE 1

Structural Model for Reading Achievement and

Self Acceptance in the Yakima Sample

ENDOGENOUS

	C1	C2	C3	D1	D2	D3	D4	E	F
A	-16*	07	26**	61**	20*	32**	11	46**	07
B	25**	02	-15*	18**	06	-05	-04	05	20**
C1		09	08	00	-14*	13*	13*	07	27**
C2			20**	-14**	-10	-14*	06	-02	02
C3		20**		00	22**	35**	06	-02	11
D1					-11**	08*	-11**	15*	-11
D2				-11**				07	14*
D3				08*			-09*	16*	04
D4				-11**		-09*		09	30**
F								21**	
ERROR	.92	.87	.80	.53	.91	.74	.91	.71	.73
R^2	.16	.25	.36	.72	.17	.45	.17	.49	.47

$\chi^2 = 74.42$ df=65 p=.19

Key: A=Socioeconomic Status; B=Sibsize; C1=Years in PEPTP; C2=Home Visitation; C3=Active Parent Involvement; D1=Reinforcement of expectations; D2=Educational/Reading Activities; D3=Educational/Occupational Expectations; D4=Language Stimulation; E=Self Acceptance; F=Reading Achievement.

* $p < .10$ ** $p < .05$

a decimal points omitted

Parent Involvement

Approximately 15.9 % of the variance in family years of PEPTP participation was associated with socioeconomic status and sibsize. About 24.8 % and 35.5 % of the variance in home visitation and active parent involvement, respectively, was explained by the contribution of socioeconomic status, sibsize and PEPTP participation.

Obviously, lower socioeconomic status families were the major participants in the PEPTP which explains the negative relationship between SES and program participation. It appears that the higher the SES the more likely a parent was actively involved in the schools. It was no surprise that the size of the family was directly related to the number of years of parent participation, since there would would be more opportunity to send successive children to the school. However, it appeared that the larger the family, the less actively the parents were involved in education. The positive relationship between home visitation and active

Social-Psychological Family Environment

Approximately 72 % of the variance in the home environment factor reinforcement of expectations was associated with the SES, sibsize and parent involvement variables. Only 16.8 % of the variance in educational/ reading activities was explained by the contribution of these variables. Socioeconomic status, sibsize and the parent involvement measures accounted for about 45.1 % and 16.8 % of the variance in educational/ occupational expectations and language stimulation, respectively.

These results suggested that reinforcement of expectations was more prevalent in low SES families, with a large number of children, that recieve a minimum number of home visits. Families exhibiting a large number of educational and reading activies were, in general, low SES, with only a few years PEPTP participation and with parents who were very involved with their child's school activities. Parents with high occupational and/ or educational expectations for their child were more likely to be from high socioeconomic background, have several years experience with the PEPTP, receive few home visits and be very actively involved in their child's educational and school activities. Finally, the quantity of language stimulation in the home appeared to be largely determined by the number of years of participation in the PEPTP and the influences of the other family environment dimensions.

Self Acceptance

Altogether these measures were associated with about 49.2 % of the variance in self acceptance scores. The results of the present analysis indicated that children who were high in self acceptance came from upper SES families with frequent parent reinforcement of expectations and high expectations for educational and occupational attainment. Children who received high scores in reading achievement on the SAT tended to view themselves more positively and more competent than their peers.

Socioeconomic status, sibsize, years of participation in the PEPTP, home visitation, active parent involvement and the four family environment dimensions combined to explain approximately 47 % of the variance in the reading achievement scores. The present analysis suggested that children who perform well on reading achievement tests came from large families and were in the PEPTP for only a couple of years. In addition, they tended to come from families which provide a great deal of language stimulation and engaged in a number of educational and reading activities.

Mathematics Achievement and Self Acceptance

The chi-square goodness of fit statistics for the overall model was 71.65 with 65 degrees of freedom (p = .2669). This chi-square represents a relatively good fit between the specified structural model and the actual observed data covariance matrix. The results of the structural equation analysis for the present model are presented in Table 2.

Self Acceptance

Approximately 45.5 % of the variance in self acceptance scores was associated with the socioeconomic status, sibsize, parent involvement, family environment and mathematics achievement scores. Children with high self acceptance scores, in this sample, tended to come from upper SES families. Within these families the parents expressed high occupational and educational expectations for their child.

Mathematics Achievement

The combination of the variables socioeconomic status, sibsize, active parent involvement, years of PEPTP partici-

TABLE 2

Structural Model for Mathematics Achievement and

Self Acceptance in the Yakima Sample

ENDOGENOUS

	C1	C2	C3	D1	D2	D3	D4	E	F
A	-15*	10	26**	60**	19*	32**	11	44**	34**
B	24**	00	-15*	17**	06	-06	-04	08	02
C1		11	08	00	-14*	15*	13*	02	01
C2			19**	-15**	-10	10	07	-02	02
C3		20**		00	21**	29**	-06	-03	01
D1					-12**	08*	-11**	11	10
D2				-12**				09	12*
D3				08*			09*	19*	-03
D4				-11**		09*		05	36**
F								09**	
ERROR	.92	.86	.80	.53	.91	.77	.91	.74	.79
R^2	.15	.26	.36	.72	.17	.40	.17	.46	.38

$\chi^2 = 71.65$ df=65 p=.27

Key: A=Socioeconomic Status; B=Sibsize; C1=Years in PEPTP; C2=Home Visitation; C3=Active Parent Involvement; D1=Reinforcement of expectations; D2=Educational/Reading Activities; D3=Educational/Occupational Expectations; D4=Language Stimulation; E=Self Acceptance; F=Mathematics Achievement.

* $p < .10$ ** $p < .05$

a decimal points omitted

pation, home visitation, educational/ reading activities, language stimulation, educational/ occupational expectations and reinforcement of expectations combined to explain 37.8 % of the variance in total mathematics achievement scores. Children who performed well on the total mathematics section of the SAT came from families with upper socioeconomic status backgrounds. Their home environments were characterized by the presence of many different educational and reading activities and their parents provide a great quantity of language stimulation.

Summary of Results

The structural models for SAT total reading and total mathematics scores were very similar. The chi-square goodness of fit statistic associated with each model suggested that they sufficiently explained the observed covariance matrices. Socioeconomic status was not significantly related to reading achievement, whereas SES was highly related to mathematics achievement. Sibsize was associated with reading but not mathematics test scores. None of the parent involvement indices were related to mathematics scores, and years of PEPTP participation was related to reading in this sample. Two of the home environment factors, educational/ reading activities and language stimulation, were associated with both achievement scores. The combination of all ten exogenous variables accounted for approximately 47% of the variance in reading test scores and 38% of the variance in mathematics test scores.

The self concept measure, self acceptance, was highly related to the other variables in the structural model. Self acceptance was consistently related to socioeconomic status and parental educational and occupational expectations for their children. Within the structural model for reading achievement, parent reinforcement of expectations and reading test scores were significantly associated with self acceptance.

TAMPA

The results of the statistical analyses for SAT total reading scores and total mathematics scores are contained in Tables 3-4. The measurement model estimates will be discussed next, followed by the results for the structural models involving total reading scores and total mathematics scores.

Measurement Model

The latent construct, socioeconomic status, was composed of the household items index, the primary provider's educational level, the primary provider's occupational status, and family income. The factor loadings for each of the observed variables on the latent construct were .672, .610, .502 and .455, for the household items index, educational level, occupational status and family income, respectively.

The construct, active parent involvement, was composed of the observed variables (1) parent classroom volunteering of an instructional kind; (2) parent classroom volunteering of a noninstructional kind; (3) PAC meeting attendance; and (4) PAC activity attendance. The factor loadings for each of the observed variables on the parent involvement construct were .973 for instructional classroom volunteering, .613 for noninstructional classroom volunteering, .547 for PAC meeting attendance and .793 for PAC activity attendance.

The remaining constructs were considered to be well represented by their respective observed variables. In other words, the construct sibsize was measured by the number of children in the family. Similarly, family years in the PEFTP, home visitation, self concept, achievement and the four home environment factors were considered to be equivalent to the constructs they purport to measure. The same measurement model was used in all subsequent analyses involving the data from Tampa.

Reading Achievement and Self Acceptance

The overall test of the present structural equation model resulted in a chi-square goodness of fit statistic of 99.10 with 87 degrees of freedom ($p = .1768$). The nonsignificant chi-square suggested that the specified structural model accurately represents the underlying relationships present in the observed covariance matrix. The results of the structural equation analysis for this particular model are contained in Table 3.

Parent Involvement

Approximately 5.9 % of the variance in the variable, years of PEFTP participation, was associated with the combination of socioeconomic status and sibsize. About 69 % and 26 % of the variance in home visitation and active parent involvement, respectively, was associated with the contribution of socioeconomic status, sibsize and years of PEFTP participation.

TABLE 3

Structural Model for Reading Achievement and

Self Acceptance in the Tampa Sample

ENDOGENOUS

	C1	C2	C3	D1	D2	D3	D4	E	F
A	15*	-09	04**	73**	15*	30**	-12	27*	48**
B	-07	-12	-01*	-03	13*	-01	-07	-02	16*
C1		58**	21*	05	-03	-13	-02	-05	-13*
C2			14**	00	-09	-01	20*	04	16*
C3		14**		02	00	13*	-19*	10	02
D1								24*	08
D2								11	09
D3								-07	12*
D4								04	05
F								16*	
ERROR	.97	.56	.86	.48	.96	.89	.93	.89	.70
R^2	.06	.69	.26	.77	.09	.21	.13	.21	.51

$\chi^2 = 99.10$ df=87 p=.18

Key: A=Socioeconomic Status; B=Sibsize; C1=Years in PEPTP; C2=Home Visitation; C3=Active Parent Involvement; D1=Reinforcement of Expectations; D2=Educational/Reading Activities; D3=Educational/Occupational Expectations; D4=Language Stimulation; E=Self Acceptance; F=Reading Achievement.

* $p < .10$ ** $p < .05$

a decimal points omitted

The evidence suggested that, contrary to expectations, more higher SES families were participating in the PEFTP in Tampa. Sibsize appeared to be unrelated to years in the PEFTP. Also, the results suggested that smaller families were more likely to receive more frequent home visits. There may be economic reasons for this finding, in that larger families necessitate the employment of both parents in order to support the family. Thus, there would be less time available for receiving home visits. As expected, the more years that a family was involved in the PEFTP the greater the likelihood of more frequent home visitation and increased active parent involvement of the parents in their child's education and school activities. It was not surprising that the frequency of home visitation and parent classroom volunteering and attendance at PAC functions were positively correlated both measures provide evidence for the active involvement of parents in the PEFTP.

Social-Psychological Family Environment

Approximately 77.2 % of the variance in the family environment factor, reinforcement of expectations was associated with socioeconomic status, sibsize, family years in the PEFTP, home visitation and active parent involvement. Only 8.8 % of the variance in educational/ reading activities was explained through the contribution of these five variables. Socioeconomic status, sibsize and the three parent involvement measures accounted for 20.8 % of the variance in educational/ occupational expectations and 13.1 % of the variance in language stimulation.

These results suggested that an inverse relation exists between reinforcement of expectations and the family's socioeconomic status. Families in which there were a great variety of educational activities and reading opportunities were, in general, large and from upper SES backgrounds. The home environment dimensions, reinforcement of expectations and educational/ reading activities, were relatively uninfluenced by PEFTP participation or parent involvement in school activities. Parents with high educational and occupational expectations for their children were more likely to be high SES, participants in the PEFTP for few years and were very actively involved in school activities. Finally, the quantity of language stimulation in the home appeared to be largely determined by the level of active parent involvement and the reception of few home visits. Socioeconomic status appeared to have a slight direct relationship with the quantity of language stimulation in the family environment.

Self Acceptance

Altogether these ten variables were associated with approximately 21.2 % of the variance in SOS self acceptance scores. The results of the present analysis indicated that children who were high in self acceptance tended to come from upper socioeconomic status families. Their parents frequently reinforce their expectations for their child's performance. It may be that children arrive at estimations of their general competence from the evaluations and subsequent praise they receive from other adults, especially their parents, when they meet these expectations. Children who received high scores on the total reading part of the CTBS also tended to possess higher scores on the measure of self acceptance.

Reading Achievement

Socioeconomic status, sibsize, years of PEFTP participation, home visitation, active parent involvement, language stimulation in the home, parent educational/ occupational expectations, educational/ reading activities and reinforcement of expectations combined to explain 51.3 % of the variance in reading achievement scores. The results of the present analysis suggested that children who obtain high scores on reading achievement tests tend to come from more advantaged families, with few siblings present in the home. Their families were in the PEFTP for relatively few or no years and they receive frequent home visits if they were participating in the program. Finally, their parents express high educational and occupational expectations for them.

Mathematics Achievement and Self Acceptance

The overall test of this structural model yeilded a chi-square goodness of fit statistic of 101.27 with 87 degrees of freedom (p = .1406). The nonsignificant chi-square indicated that the specified structural model reasonablely represents the relationships underlying the observed covariance matrix. The results of the structural equation analysis for the present model are presented in Table 4.

Self Acceptance

Together the ten variables were associated with approximately 20.8 % of the variance in self acceptance scores.

TABLE 4

Structural Model for Mathematics Achievement and

Self Acceptance in the Tampa Sample

ENDOGENOUS

	C1	C2	C3	D1	D2	D3	D4	E	F
A	15*	-09	04	73**	14*	30**	-12	32*	14*
B	-07	-11*	-02	-03	13*	-01	07	-01	20**
C1		58**	21**	05	-03	-13	-01	-06	-04
C2			14**	00	-09	-02	20*	02	26**
C3		13**		02	00	13*	-19**	12	-10
D1								26*	-05
D2								12*	-.02
D3								-09	26**
D4								02	14*
F								16*	
ERROR	.97	.56	.86	.48	.96	.89	.93	.89	.74
R^2	.06	.69	.26	.77	.09	.21	.13	.21	.45

χ^2= 101.27 df=87 p=.14

Key: A=Socioeconomic Status; B=Sibsize; C1=Years in PEPTP; C2=Home Visitation; C3=Active Parent Involvement; D1=Reinforcement of Expectations; D2=Educational/Reading Activities; D3=Educational/Occupational Expectations; D4=Language Stimulation; E=Self Acceptance; F=Mathematics Achievement.

* $p < .10$ ** $p < .05$

a decimal points omitted

Children with high self acceptance scores, in Tampa, tended to come from upper SES families and had few siblings. There were a diversity of educational and reading activities within their home environments, as well as frequent and positive reinforcement of performance expectations. Children who performed well in mathematics tended to have more positive views of their general competence than those children performing poorly in mathematics.

Mathematics Achievement

The ten variables socioeconomic status, sibsize, years of PEFTP participation, home visitation, active parent involvement, language stimulation, educational/ occupational expectations, reinforcement of expectations and educational/ reading activities combined to explain about 45.1 % of the variance in CTBS total mathematics achievement scores. Children with high mathematics scores tended to have few siblings and were from upper socioeconomic status families. If they were in the PEFTP, the frequency of home visits were a positive contribution to mathematics performance. Their family environments were characterized by frequent and diverse language stimulation and their parents held high educational and occupational expectations for their future.

Summary of Results

The structural models for the CTBS total reading and total mathematics scores were similar. The chi-square goodness of fit statistic associated with each model indicated that they sufficiently explained the observed covariance matrices. Socioeconomic status and sibsize were significantly related to the achievement measures. The number of years of PEFTP participation and home visitation were associated with reading achievement scores. Home visitation was the only parent involvement measure related to mathematics achievement. The only home environment factor related to reading scores was the expectations parents possess for their child's future educational and occupational attainment. Language stimulation in the family and educational/ occupational expectations were significantly associated with mathematics achievement. The contribution of the exogenous variables explained approximately 51% of the variance in reading achievement scores and 45% of the variance in mathematics achievement scores. The self concept measure, self acceptance was closely associated with the other variables in the structural models. Self acceptance was associated with SES, reinforcement of expectations, language stimulation and reading achievement.

Summary

The hypothesized structural model for the relationships among the socioeconomic status, sibsize, years of PEPT participation, home visitation, active parent involvement, the four social-psychological family environment factors, child self concept and child academic achievement provided an adequate representation of the observed data. The specified structural relationships sufficiently accounted for the covariation in the matrix of observed varables. Within the model SES and sibsize were related to the parent involvement measures, the home environment dimensions and the achievement and self concept of the children. SES was directly and indirectly related to achievement through the home environment and parent involvement measures. Parent involvement influenced positive changes in the quantity of verbal stimulation and the expectations of parents in the family. In addition, active parent involvement was related to increases in the achievement performance and to a lesser degree the self concept of the participating children. The social-psychological environment of the family defined from a social learning perspective was strongly related to the achievement and self concept of children.

Qualifications

Several caveats need to be mentioned regarding the statistical treatment of these data using covariance structure analysis. Bentler and Bonett (1980) comment that "little is known about the relative robustness of the estimators to violations of assumptions or model misspecifications and about their relative small-sample properties" (p. 519). Departures from multinormality within the observed data may have serious consequences for the chi-square values, although problems of this kind need not have any effect on the individual parameter estimates. In particuliar, the chi-square test statistic is known to be quite sensitive to departures from multinormality making the goodness of fit test problematic.

A second issue relates to the sample size. The statistical analysis procedure used, covariance structure analysis using the LISREL IV program, requires a large sample size to produce unbiased and robust estimates of the structural model parameters. The effect on the analysis when the sample size is small has not been fully investigated at this time. Preliminary Monte Carlo studies by Boomsa (in press) suggest that when the sample size is less than 200, the maximum likelihood estimates of the model parameters may be suspect. More importantly the ratio of the number of variables in the model to the sample size may be more crucial than sample

size alone. There are many rules of thumb in the factor analytic statistical literature for deciding the sample size relative to the number of variables in the analysis. Common ratios of ten to twenty subjects per variable are suggested. Ifse decision rules are generalizable to the covariance structure analysis, then there are barely enough subjects in the present study to achieve the criterion. Some of the parameter estimates may be biased.

Finally, there may be variables which are important contributors to the structural relationships within the model that have not been included in the model. For example, it was recognized that parent and child intelligence measures should be included in the structural model. The absence of these measures increases the possibility of specification error which may cause some of the estimated structural coefficients to be attenuated or inflated depending upon the their covariation with the variables not included in the model (Bohrnstedt & Carter, 1971; Duncan, 1975; Joreskog, 1977).

Therefore the findings discussed in the present study should be viewed as tenative until further replications of the structural model have been completed. Confirmation of the findings in the present investigation await additional research with larger numbers of families.

SUGGESTIONS FOR FUTURE RESEARCH

Although the findings reported within the present study are tenative, they do contribute to the present understanding of the relationship between parent involvement in an intervention program and the family learning environment. Future research in this area should expand on the present structural model in two major ways. They are (1) the inclusion of additional variables within the structural model and (2) the longitudinal study of the reciprocal influences present within the model.

Several additional variables could be included in the structural model which would make it more realistic. Parent and child mental ability measures would provide an important dimension which is lacking in the present model. Equally it may prove valuable to include measures related to what occurs while the child is in school. School related variables such as engaged time in instruction, the instructional methods used by the teacher (i.e., direct instruction), and classroom climate obviously would contribute to the total explained variance in achievement and self concept scores. Including more refined measures of parent involvement such as time engaged in instructional activities may further ex-

plicate the relationship between parent involvement and the other variables in the model. Many more variables could be mentioned and the present list is not meant to be exhuastive its purpose is to indicate possible expansions of the present model.

It was recognized that there exist reciprocal relationships between several of the variables included in the structural model. Reciprocal relationships may be specified between: (1) parent involvement in the PEPTP and the home environment dimensions; (2) self concept and achievement; and (3) achievement and the home environment. The only way that it would be possible to estimate the reciprocal influences in the specified variables is through the conduct of well designed longitudinal studies. Investigations of this type would provide more accurate representations of the causal associations between the variables included in the present structural model.

Conclusion

The results of this investigation provide valuable information useful for the planning and design of future educational projects containing a parent involvement component. The findings supply empirical evidence regarding the importance and kind of parent participation which is most closely related to child achievement and self concept.

In addition, a model of the family learning environment was developed from the perspective of social learning theory. The research provides additional empirical support for the social learning conceptualization of the home environment involving the reinforcement, stimulation and expectation dimensions. These three genotypic dimensions of the family environment were related to child achievement.

Finally, the demonstrated significant interrelationships contribute to the understanding of the important dimensions operating within the family learning environment which enhance cognitive and affective development in children. The identification of potentially alterable characteristics within the home environment clearly aids in the developement of more successful intervention programs.

Research on family environments is important for two reasons. First, the relative importance of the home environement in the lives of all individuals makes a theoretically grounded and empirically sound understanding of the phenomenon essential. Second, the development of empirically verifiable models of the family social-psychological environment is necessary for the development of successful comprehensive

intervention and early education programs. Parent education programs may benefit most from research of this kind, but more basic skills oriented pregrams may also benefit from an increased understanding of the environment where the child spends most of his or her waking hours.

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